Aviation Systems Division Overview

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AF Deputy Division Chief (acting)

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You are here


Ames
Dryden
Jet Propulsion
Laboratory (JPL)
Glenn
Goddard
Headquarters
Langley
Marshall
Stennis
Johnson
Kennedy

Ames Aeronautical Laboratory

November 1940

Moffett Field

1943

* National Advisory Committee on Aeronautics (predecessor to NASA)

NASA Headquarters

Administrator: Charles Bolden

Deputy Administrator: Lori Garver

Mission Directorates

Mission Support Offices

Four Mission Directorates

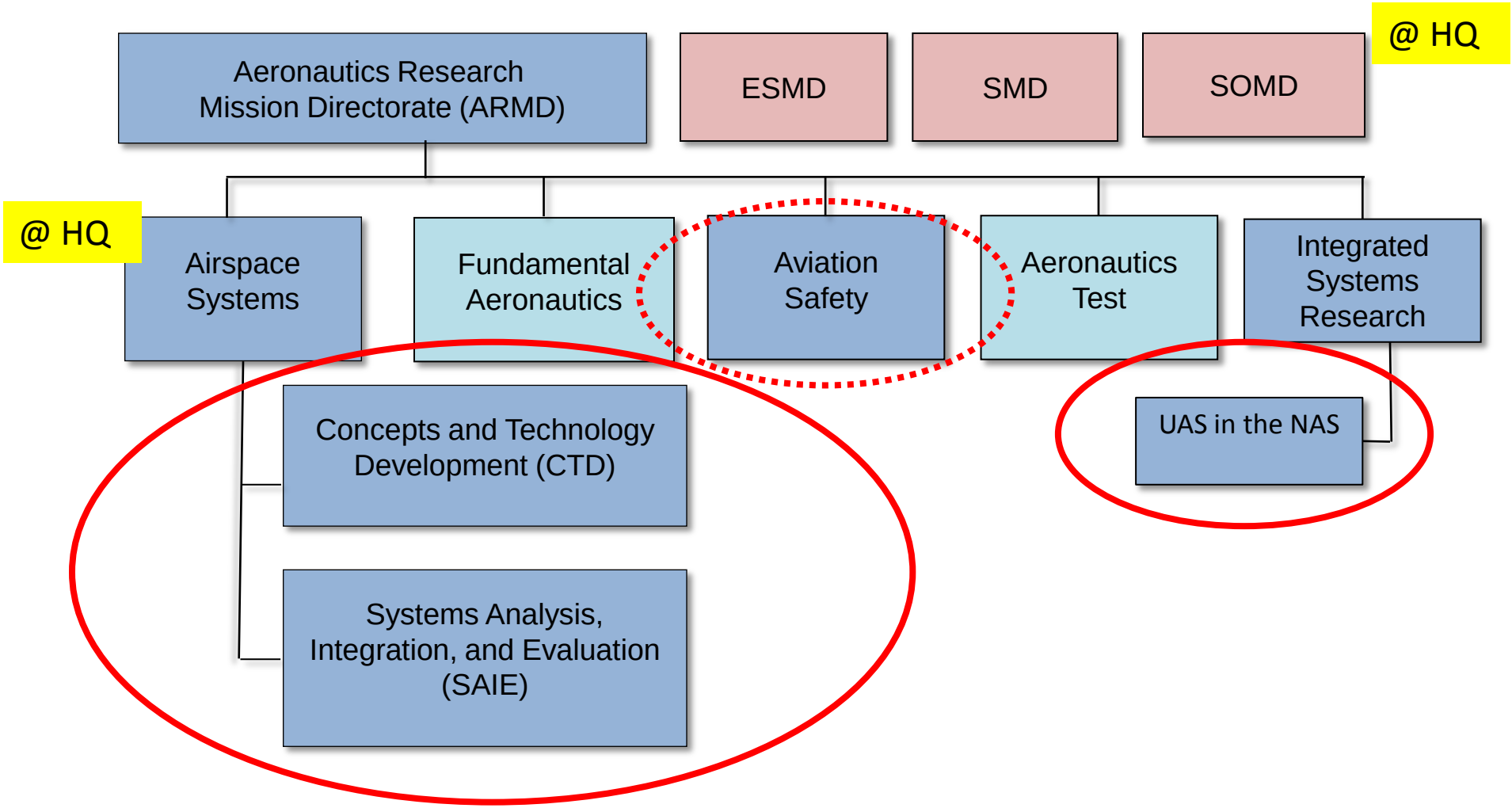
- Aeronautics Research Mission Directorate (ARMD)
  (Dr. Jaiwon Shin)

- Exploration Systems Mission Directorate (ESMD)
  (Doug Cooke)

- Science Mission Directorate (SMD)
  (Dr. Ed Weiler)

- Space Operations Mission Directorate (SOMD)
  (William Gerstenmaier)

Missions, Programs, Projects



Airspace Systems Program

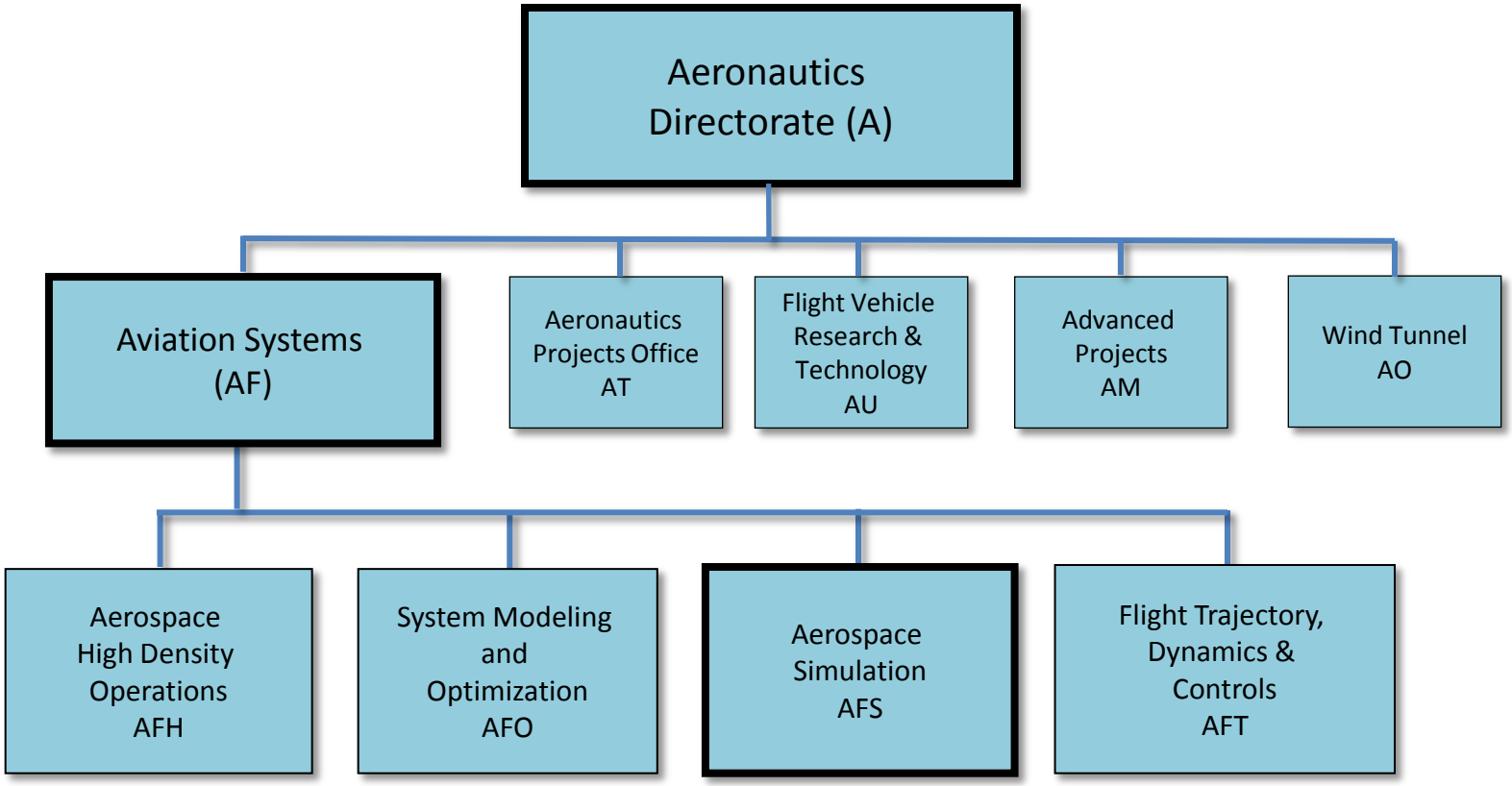
- Develop technologies and capabilities to improve efficiency, capacity, reduce delay, minimize environmental impact, maintain high safety levels

- Work is coordinated with the Joint Planning and Development Office (JPDO)

- Concept and Technology Development
  - Separation Assurance
  - Traffic Flow Management
  - Airspace Super Density Operations
  - Dynamic Airspace Configuration
  - Safe and Efficient Surface Operations

- System Analysis, Integration and Evaluation
  - System and Portfolio Analysis
  - Interoperability Research
  - Integration, Evaluation and Transition

Ames Aeronautics Org Chart

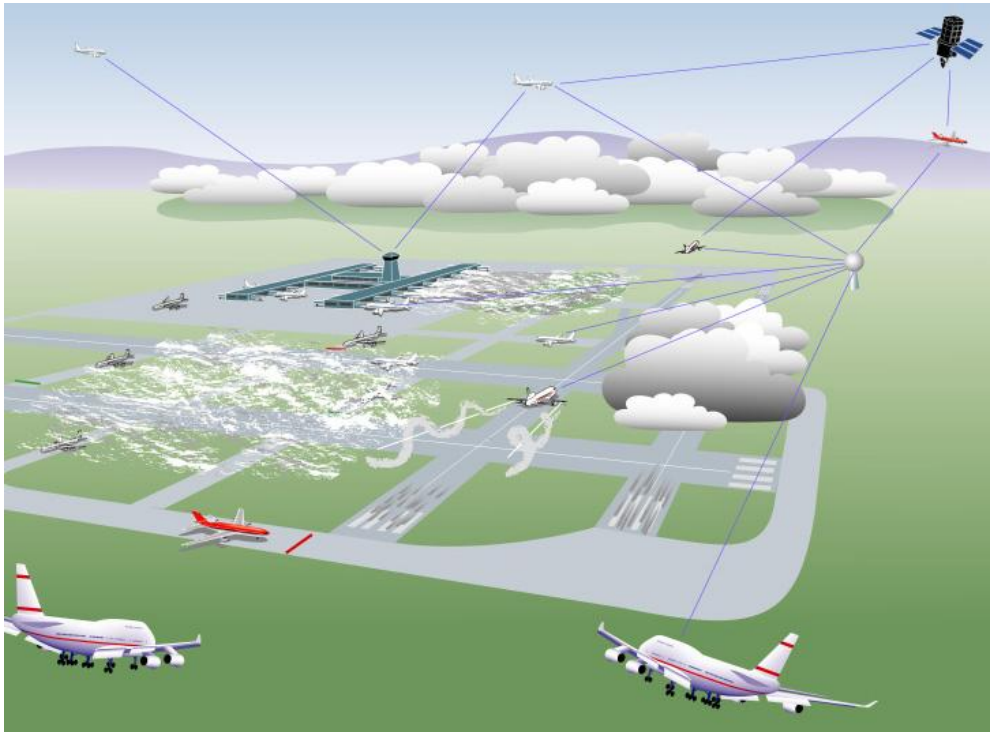


Aviation Systems Division: What do we do?

- Three Research Branches
  - Aerospace High Density Operations
  - Systems Modeling and Optimization
  - Flight Trajectory, Dynamics and Controls

- Aerospace Simulation Branch
  - Major facilities:
    - Vertical Motion Simulator
    - Crew-Vehicle Systems Research Facility
      - Advanced Concepts Flight Simulator
      - Boeing 747-400
      - Air traffic control simulation
    - Future Flight Central
    - ATM simulation laboratory
  - Simulation scenario development

Air Traffic Management Research



Develop automation concepts and technologies to manage and control potentially 3x today's air traffic ("NextGen"), under all weather conditions, and including new classes of air vehicles (such as Unmanned Aerial Systems)

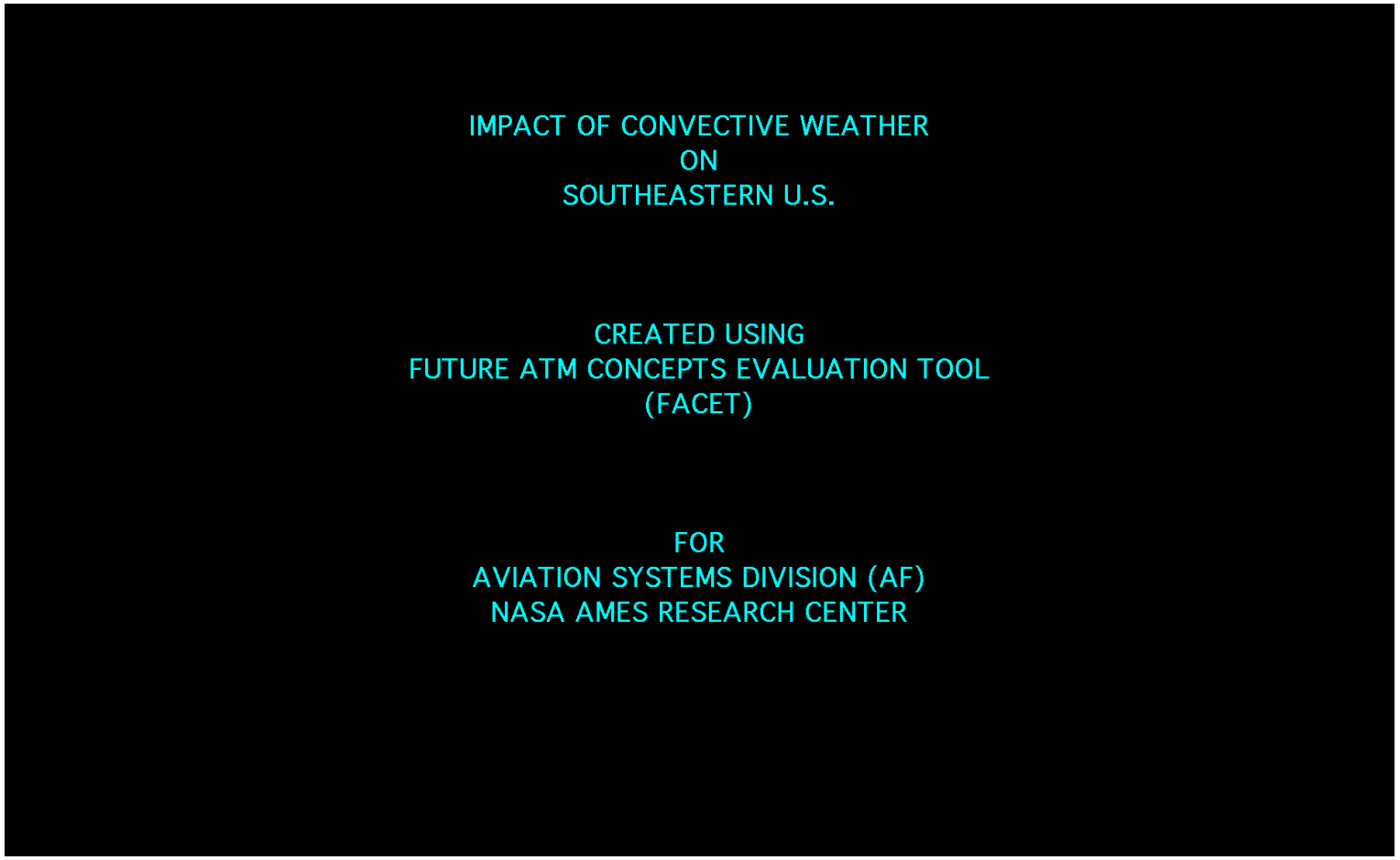
A DAY IN THE LIFE OF
AIR TRAFFIC OVER
THE CONTINENTAL U.S.

ANIMATION CREATED USING

FUTURE ATM CONCEPTS
EVALUATION TOOL
(FACET)

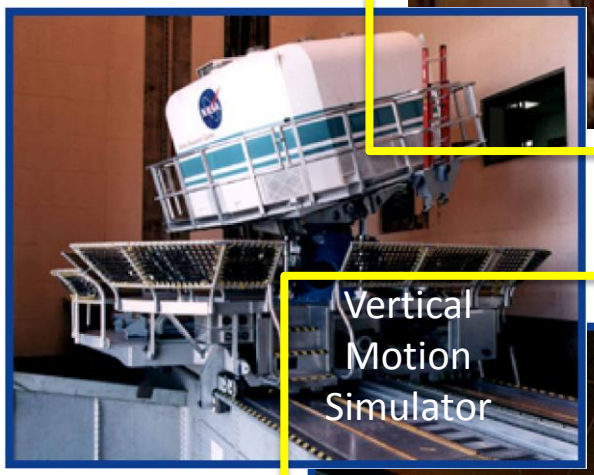
FOR
AVIATION SYSTEMS DIVISION (AF)
NASA AMES RESEARCH CENTER

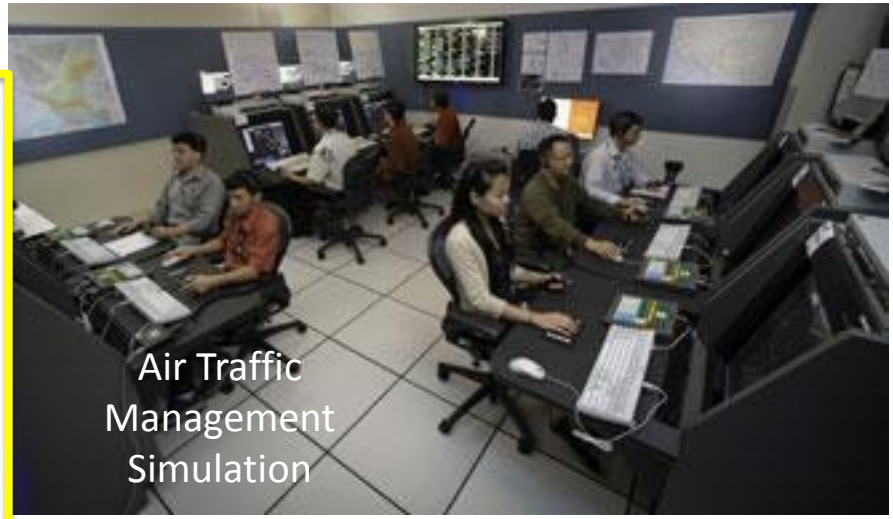
The Effect of Convective Weather



Simulation Facilities

Crew Vehicle Systems Research Facility





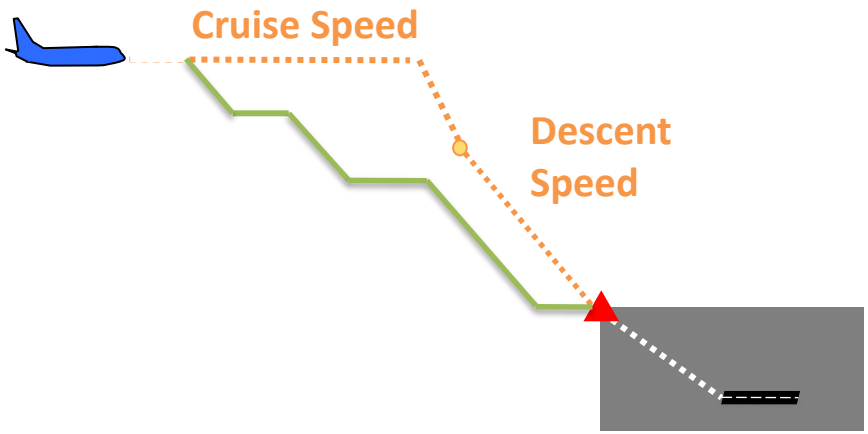
Simulations

Simulation	Facility
Efficient Descent Advisor (EDA)	N257 ATC Lab
Surface and Runway Departure Advisor (SARDA)	Future Flight Central
Terminal Area Precision Scheduling System (TAPSS)	N210 ATM Lab
Terminal Area Procedures for Parallel Runways (TAPPR)	CVSRF
Navy Broad Area Maritime Surveillance	CVSRF +
Trajectory-Based Automation System for En Route and Transition (TBAS-ET)	N257 ATC Lab
Emergency Landing Planner (ELP)	CVSRF
Terminal Tactical Separation Assisted Flight Environment (T-TSAFE)	N210 ATM Lab
Generic Airspace	N257 ATC Lab

Airspace Systems Program:

Efficient Descent Advisor

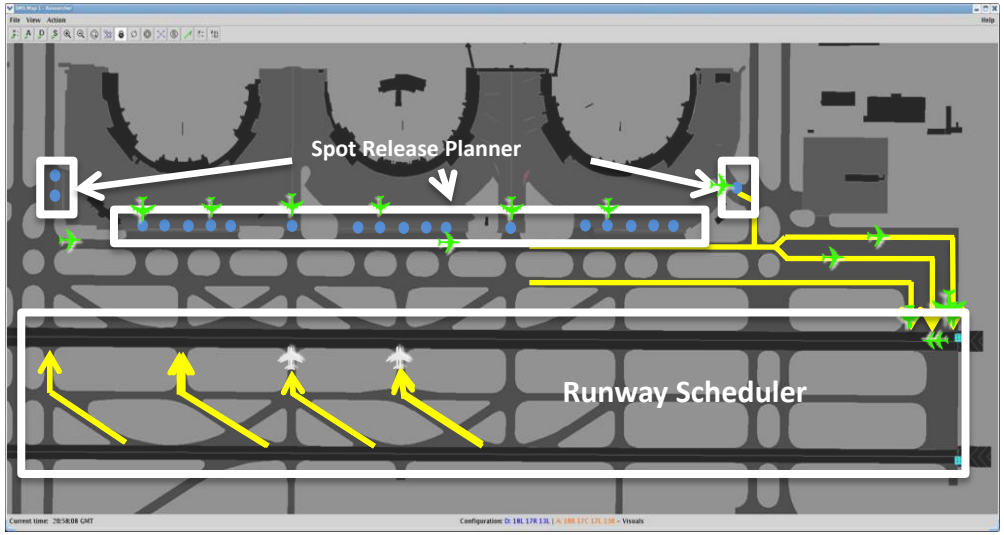
- A near-term decision-support tool that enables more environmentally friendly descents by minimizing fuel burn, noise, and emissions.
- EDA computes trajectories and clearance advisories for conflict-free, time-based arrival metering
- Five human-in-the-loop simulations in SimLabs have been conducted so far; one has also used the B747-400 cockpit cab

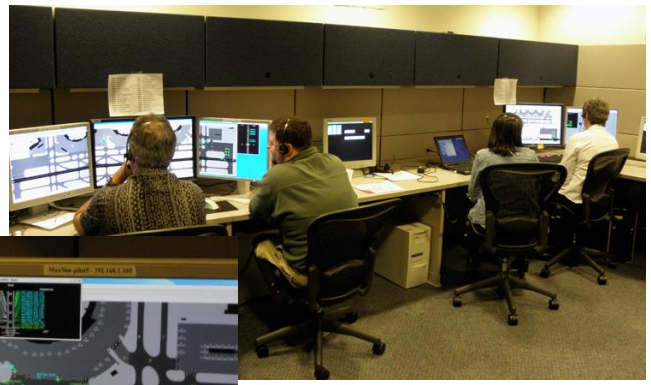


Airspace Systems Program:

Surface Automation

- Tested surface scheduling algorithms to reduce delay at the spot and the runway queue area during departure
- Demonstrated potential reduction in delay and emissions
- Initial experiment in Future Flight Central without out-the-window view





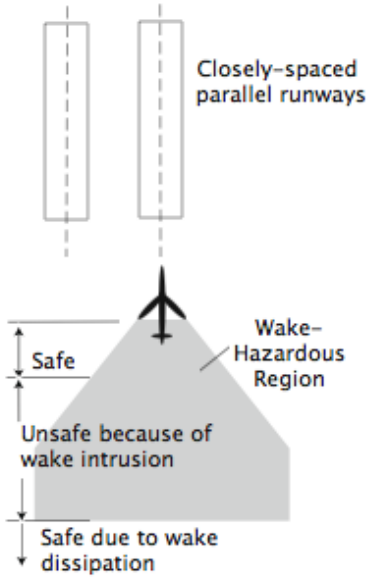
Terminal Area Scheduling

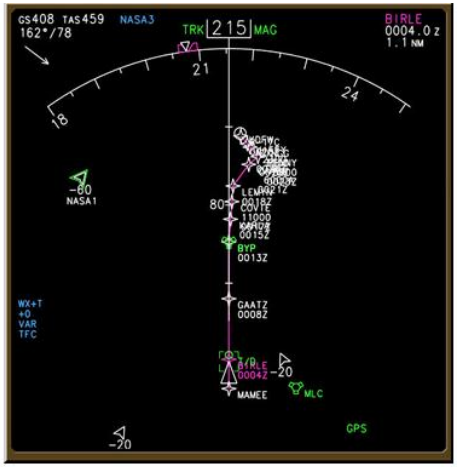
- Merged several scheduling capabilities to derive a coordinated schedule for a major terminal area
- Conducted a comprehensive airspace simulation including en route and terminal controller positions
- Utilized ATM simulation laboratory

Airspace Systems and Aviation Safety Program:

Terminal Area Paired Procedures

- Tested procedures for pairing of aircraft for closely-spaced parallel approach procedures for runways 750 ft. apart
- Examined, for the first time, simultaneous impact of procedures on both air traffic control and the airline cockpit
- Utilized both the ACFS cockpit and ATC simulation lab at CVSRF





Integrated Systems Research Program:

UAS Integration in the NAS

Who is in charge of separating UAS from other aircraft, and when?

UAS Operator at the Ground Control Station

Autonomous Unmanned Aircraft

Controller

www.aviationsystems.arc.nasa.gov